

# Reading Questions 1

page 4: the entire page

page 5: the entire page

1. The symmetries of a square are squares.
2. Combining two symmetries of a square produces another symmetry.
3. How many rotation symmetries are on the square?

## Section 1.1 Symmetries of a Square (Part 1)

### The table of $D_8$

**P 1.** Compute  $R_{90}DVVHR_{180}$ .

**P 2.** Compute the second row of the table for  $D_8$ . That is, compute  $R_{180}X$  for all  $X$  in  $\{R_0, R_{90}, R_{180}, R_{270}, H, V, D, D'\}$ .

**P 3.** Find 2 elements  $x, y$  in  $D_8$  such that  $x \neq y$  and  $xy \neq yx$ .

**P 4.** Find 2 elements  $x, y$  in  $D_8$  such that  $x = y$  and  $xy = yx$ .

### Alternative Notation

**Definition: alternative definition of  $D_8$**

$$D_8 = \langle a, b \mid a^4 = b^2 = e, ba = a^3b \rangle$$

**P 5.** Use the alternative definition of  $D_8$  to compute  $R_{90}DVVHR_{180}$ . Write your final answer in terms of an element of  $D_8$ .